CONSTRUCTION AND FABRICATION

BUILDING CONSTRUCTION
MACHINE SHOP
WELDING
SHEET METAL
PIPING

12, 12A
22A, 22B, 22C
32A, 32B, 32C

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NOTE: This Curriculum Guide is a service publication only. The Senior High School Program of Studies contains the official statement concerning Senior High School Drafting. The information contained in the Guide is prescriptive insofar as it duplicates that contained in the Program of Studies. There are in the Guide, however, as well as content, methods of developing the concepts, suggestions for the use of teaching aids and lists of additional reference books.

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I. INDUSTRIAL EDUCATION

Industrial Education is a program consisting of courses which provide a continuum of experiences, starting with exploratory activities in the junior high school and expanding in the high school to the development of skills related to career fields. This development of the student's skills is planned for through courses in Industrial Arts and Vocational Education culminating in on-the-job work experience, or entry into a job or post-high school institution for further education.

The program consists of courses ranging from those designed for an exploration of the technologies and trade areas to units of practical preparation for a career. In the process the courses develop the student's knowledge of himself, his talents and his skills.

The Industrial Education course "guides" provide the teacher with an outline of the topics, generalizations and concepts selected as most relevant for the physical and mental development of the students and the logical development of the subject area in accordance with the resources of the school in both teaching personnel and facilities.

The Guide leaves much scope for the teacher to develop content related to the topics, especially in writing behavioral objectives describing specific changes in student behavior anticipated from the learning tasks.

It is expected that each school district will develop a program of Industrial Education appropriate to the fulfilment of the needs of its student clientele.

II. OBJECTIVES

A. Industrial Education Objectives

The general objectives of Industrial Education complement the aims and objectives of secondary school. The objectives of Industrial Education are to:

1. Develop basic competencies both academically and in work skills to enter either a job or a post-high school institution for further education.

2. Provide courses that serve as a vehicle in helping students relate their academic knowledge to vocational competencies.

3. Provide the curriculum content for students to develop fundamental tool and procedural skills which prepare them to enter a family of occupations.

4. Provide the environment whereby students may develop sound attitudes and habits of work.

B. The Objectives of the Career Field of Construction and Fabrication

The Construction and Fabrication career field should provide a student an opportunity to:

1. Gain an understanding of the career field.

2. Develop skills and knowledge necessary for job entry and/or articulation with post-secondary educational institutions.

3. Develop a standard of performance acceptable to craftsmen in the trade, government and industry.

4. Study union organization and legislation regulating working conditions.

C. The Objectives of the Major Area of Study

The specific objectives of the major area of study such as automotives etc., must be developed by the teacher in harmony with the stated objectives of the Career Field, the Industrial Education Program and the Secondary School.

III. EVALUATION

Evaluation of student growth should be based on stated behavioral changes and specific criteria understood by the students. Allowance should be made for both self and teacher evaluation and in some cases peer evaluation. Evaluation should further be based on the three domains of learning as defined by an Alberta committee of Industrial Education teachers. Their categories are as follows:

a. Verbal and Written Communication

b. Personal Growth

c. Manipulative Skills

The weighting given each of the three measures will depend on the nature of the behavior being evaluated. For a more detailed treatment of evaluation see the Industrial Education Handbook.

IV. ORGANIZATION

A. Guide Organization

The course guides are developed on the following pattern:

1. Topic: Each course is subdivided into a number of topics.

2. Generalization: The main generalization or "big" idea that students should learn follows each topic.

3. Concepts: The concepts divide the topic into the teaching components. They give more direction on specific areas that should be studied.

4. Behavioral Objectives: These describe specific changes in student behavior which result from the learning tasks he performs.

   The Guide gives only a few sample Behavioral Objectives. It is the responsibility of the teacher to develop as many behavioral objectives as he can teach in the time available.

5. Suggested Activities: A few suggestions are made as to the types of activities that could be used to achieve the behavioral objectives.

6. Resource Materials: This column suggests where materials may be obtained.

B. Building Construction Program Organization

1. Program Description

The Building Construction modules give students the opportunity to learn the theory and skills necessary in the carpentry trade. They will learn to identify and use hand and power tools to perform the major processes of shaping, forming and fastening wood products. Their projects can include activities ranging from forming for concrete to building fine furniture. In the process they will learn about the trade, job opportunities, business practices and enough skills to get a job, go into apprenticeship or enhance their avocational interests.

2. Program Organization

The course is divided into seven five credit modules. Entry into the program is through, Materials 10, General Technology 10 or Building Construction 12. The second and third level modules ("22" and "32") are non-sequential and can be taken in any order with the exception of Building Construction 32C.

32C is the last course in the 35 credit sequence and can be used to:

a. Provide greater depth to a module taken previously.

b. Take work in actual construction under a work experience plan whereby the Building Construction teacher supervises the student on the job. The student must be under the supervision of a journeyman while on the job.

In addition to the modules set out in the major for Building Construction a student may select modules designated as minors. These are normally the first level or introductory course of the area, e.g. Electricity would be Electricity - Electronics 12.

A student wishing to meet the requirements of the Apprenticeship Branch must complete all seven modules in the major area.

Some students, however, may take only a few modules in a major area as a supplement to their academic program or they may broaden their selection to other career fields. The scope of the Industrial Education program allows the flexibility necessary for the program to be tailored to meet the interests and needs of the individual class or student.

The chart on page 6 gives a graphic description of the Building Construction program. Each module is identified and the sequences are indicated by lines, e.g. After a student has completed one of Building Construction 12 or Materials 10 or General Technology 10 he/she may advance to any module to which the solid line leads. In this case any of 22A, 22B, 22C, 32A or 32B. Only 32C requires that all modules above it be completed.

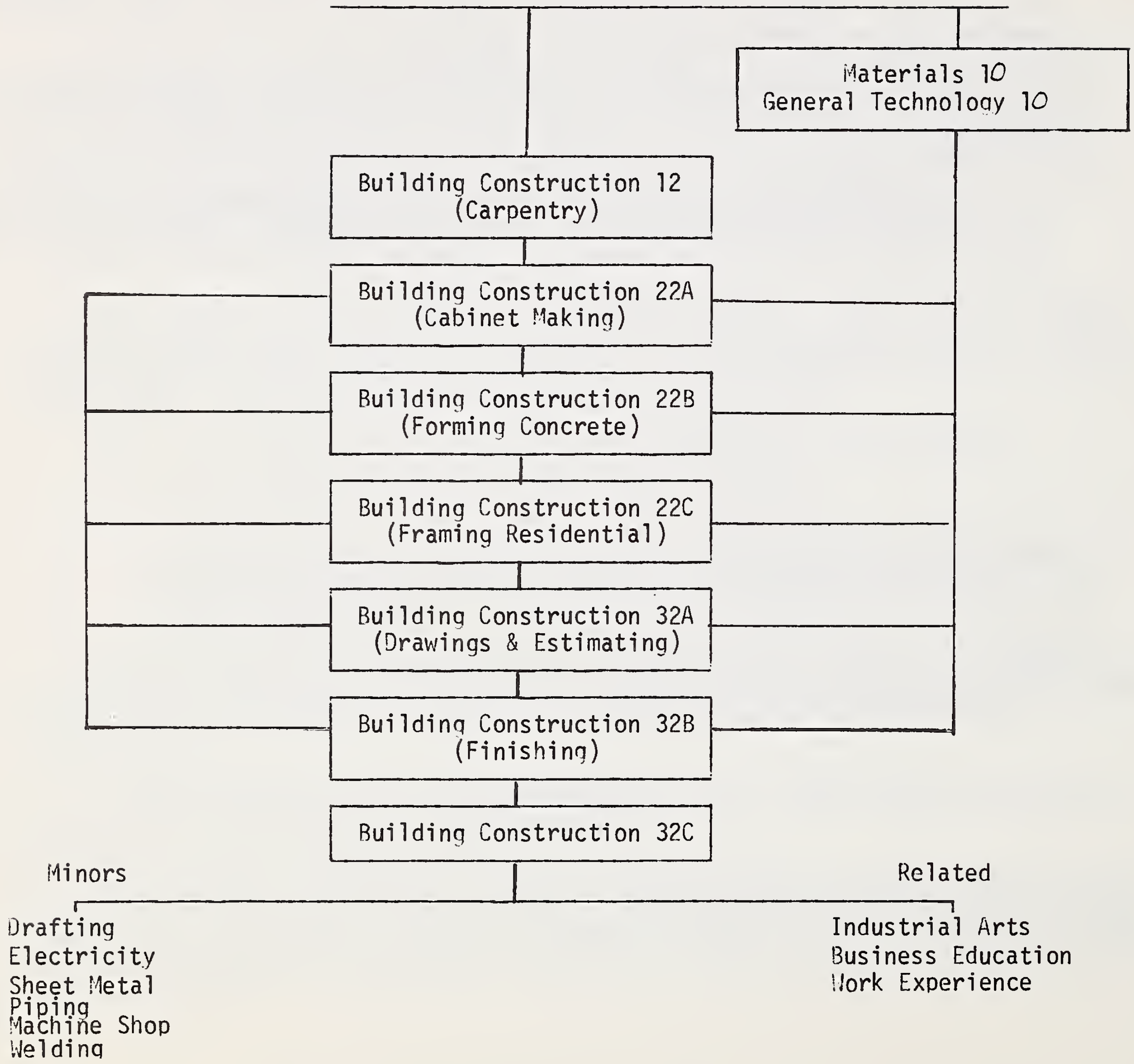
Once a student has enroled in a "22" or second level course he may also select modules from the minor fields. Minors for which grants are available are listed on the chart.

Students may find some of the courses in the listed related fields beneficial to their career program development. They are encouraged to take them even though these related courses are not supported by special grants.

CAREER FIELD

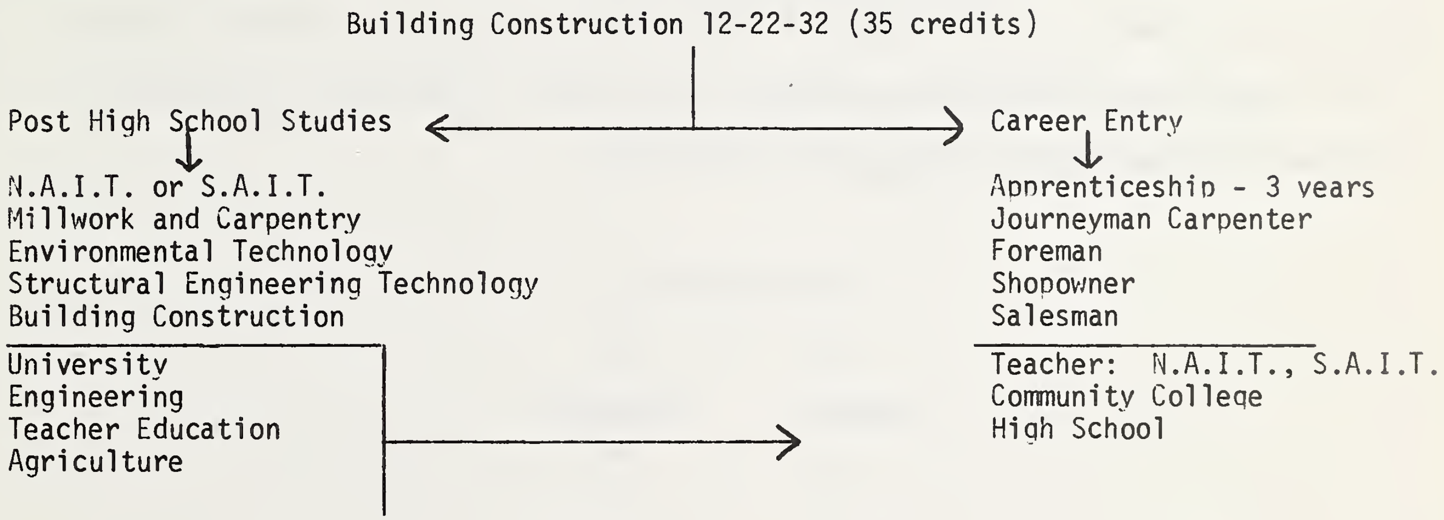
CONSTRUCTION AND FABRICATION

Building Construction



V. CAREER OPPORTUNITIES

Students taking all or most of the modules in the Building Construction major may look forward to the following opportunities:



Building Construction 12-22-32 (35 credits)

Post High School Studies

N.A.I.T. or S.A.I.T.
Millwork and Carpentry
Environmental Technology
Structural Engineering Technology
Building Construction

University
Engineering
Teacher Education
Agriculture

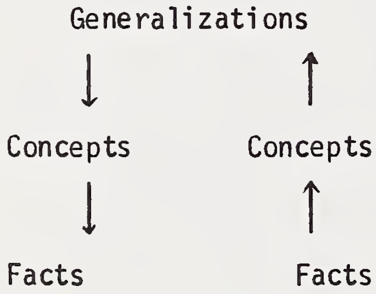
Career Entry

Apprenticeship - 3 years
Journeyman Carpenter
Foreman
Shopowner
Salesman

Teacher: N.A.I.T., S.A.I.T.
Community College
High School

Note:

As a result of variation in levels of practicality or abstraction in the "concepts" and "generalizations" identified for this course as compared with others, these expressions may appear to be used somewhat differently from course to course. However, it is the intent of the curriculum developers to maintain a consistent interpretation. The diagram below may help to explain the relationship.



Facts are taken to be items of specific information, concepts are categories of information and generalizations express the relationship between concepts.

In planning a lesson, the teacher moves down this hierarchy whereas in learning, the student begins with facts and moves upward.

VI. BUILDING CONSTRUCTION

I. BUILDING CONSTRUCTION 12 and 12A

Introduction to Carpentry

INTRODUCTION

As inferred by the title this module is to be very broad in nature; a high level of skill development will not be expected. It is hoped that with the variety of topics presented the students will:

(1) become familiar with a large number of tools and materials,
(2) learn about the scope of the carpentry trade, and
(3) become interested in pursuing further studies.

The suggested "Topics" for this "Module" are listed below.

I. TOOL PROCESSES USED IN MEASURING AND LAYOUT
II. MEASUREMENT AND MATHEMATICS
III. SAFETY CONSCIOUSNESS
IV. PLANNING AND DESIGN
V. MATERIAL PROPERTIES
VI. CAREER FIELD STUDY

MINI-MODULE FOR GENERAL TECHNOLOGY 10

The mini-module consists of 65 hours of course work selected by the teacher from the topics listed in this guide.

REFERENCES

Bellis, H. F. and W. A. Schmidt. *Blueprint Reading for the Construction Trades.* Toronto, McGraw-Hill, 1968.

Groveman, C. H. *General Woodworking.* Toronto, McGraw-Hill, 1959.

Harris. *Cabinet-Making and Building Construction.* Toronto, McGraw-Hill.

McDonnell, L. P. *Hand Woodworking Tools.* Delmar Publishers (Canada) Ltd., 1410 Birchmount Road, Scarborough, Ontario, 1962.

McDonnell, L. P. *Portable Power Tools.* Delmar Publishers (Canada) Ltd., 1410 Birchmount Road, Scarborough, Ontario, 1962.

Smith, R. C. *Materials of Construction.* Toronto, McGraw-Hill.

Career Field: Construction and Fabrication

Topic I: TOOL PROCESSES USED IN MEASURING AND LAYOUT

Major: Building Construction

Generalization A: Careful and accurate layout of material prior to shaping is essential.

Course: Building Construction 12 (Carpentry)

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Measuring, Layout and Marking Tools	5	The student will: a. list the names and uses for a variety of these tools and use them in job situations they encounter. b. use the following tools both in shop drawings and on actual stock: steel measuring tapes, squares, rules, dividers, sliding T-bevels, marking guages, pencils.		

Notes:

Topic II: SAFETY CONSCIOUSNESS

Generalization B: A knowledge and practice of safety is essential to all shop activities.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Unsafe Act		The student will: a. list the consequences of unsafe acts in carpentry and construction as they relate particularly to: (i.) lifting (ii.) climbing and descending ladders (iii.) edge tool use (iv.) electrical wires (v.) power tools (vi.) protective clothing (vii.) eye shields	Analyze two activities for unsafe acts. Analyze a tool operation for unsafe conditions. Maintain tools in proper working condition and make sure that protective equipment is always in place and/or immediately available.*	
2. Unsafe Condition		a. discuss how to identify conditions which could lead to injuries on the job. b. list benefits under the Workmen's Compensation Act.		

Notes: *Not only guards and fences in place but also facemasks, goggles, push sticks, push blocks, etc., near at hand!

Topic III: TOOL PROCESSES USED TO SHAPE MATERIALS

Generalization C: Through the use of tools materials are shaped by removing, combining, and forming.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
1. Removal (i.) Shearing	25	a. identify and demonstrate the proper use of the following cutting, smoothing, and boring tools: Handsaws, chisels, planes, knives, scrapers, surform tools, brace & bits, twist drills, countersinks b. use the radial arm saw, table saw, to cut up large material for projects and jobs. c. rip and crosscut on the table-saw and radial arm saw. d. joint the edge of boards on the jointer.		

Notes: Students will use these tools a great deal more in later modules such as "Cabinetmaking". This is merely the introductory stage and more complex uses will be learned as necessary.

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
2. Combining		The student will:		
(i.) Mechanical		a. list the names and demonstrate the uses of a number of assembling and holding tools: hammers, nail sets, screw drivers, clamps, vises, saw horses.		
(ii.) Adhesion		a. discuss various types of glue and their special uses.	Test a glue joint.	
		b. make a rule joint with a minimum length of 8" using furniture glue, e.g. Bondfast		
3. Forming				
(i.) Bending		a. describe how to shape wood by bending.		
	3			

Notes:

Topic IV: TOOL MAINTENANCE

Generalization D: In order to do the best possible job with the least effort and maximum safety tools must be maintained in excellent condition.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
1. Maintenance				
(i.) Grinding		a. give the correct angles for grinding plane irons and chisels and sharpen one of each.	Make practice grinds with 1/8" thick by 1" wide steel.	
		b. grind a tool to a square face, with one continuous grind angle and no burn.		
(ii.) Whetting		a. whet plane irons and chisels to maintain sharpness between grindings.	Tools from home can be sharpened at school for extra practice.	
(iii.) Adjusting		a. keep tools properly adjusted by maintaining the tools he uses; frequent checks by the teacher will encourage students to check tools they are using.	Students, each in turn through the module, may be asked to check the condition of tools in the shop.	
(iv.) Cleaning		a. clean off rust, gum, pitch, etc. from tools.	Clean and polish tools using wire brushes and Wet-or-Dry sandpaper.	
		b. polish tools to a smooth finish.		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
(iv.) Cleaning		The student will:		
		c. take proper care of paint brushes and be required to demonstrate this knowledge after painting or varnishing.	Clean brushes.	
		d. describe the different types of thinners/cleaners for different finishing materials.		
	5			

Notes: Saw filing will be done by students in later modules.

Topic V: MEASUREMENT AND APPLIED MATHEMATICS

Generalization E: Skilled tradesmen must be able to perform elementary mathematical computation and understand relationships between measuring systems.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
1. Trade Mathematics				
(i.) Addition		a. add whole numbers, fractions, and decimal fractions.		
(ii.) Subtraction		b. subtract whole numbers, fractions, and decimal fractions.	At least one work sheet for (i), (ii), (iii), (iv). Some students will need more practice on (iii) and (iv). Also use in practical situations.	
(iii.) Multiplication		c. multiply whole numbers, fractions, and decimal fractions.		
(iv.) Division		d. divide (as above).		
(v.) Percentages		e. use percentages to find % wastes, % discounts, % distances, % interest.	One work sheet plus practical use. Some students may need more work sheets for practice.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
2. Measurement Systems		The student will:		
(i.) English		a. convert inches to feet and yards, dollars to cents, minutes to hours and days.		
		b. calculate costs of material priced as lineal feet, square feet and square yards.		
		c. calculate volumes expressed in board feet and the costs thereof.		
(ii.) Metric		a. be aware of the metric system and its implication for the carpentry trade.		
	3			

Notes:

Topic VI: PLANNING AND DESIGN

Generalization F: Planning and design are essential prior to the construction of an attractive and durable product of any kind (shop project, cabinet, or building).

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
1. Drafting*		a. use and care for the basic drafting tools.	Draft the plans for simple projects they build (e.g. sanding block, bench hook, coping saw jig, etc.)	
		b. do basic drawing procedures (e.g.-centering, drawing vertical, horizontal, and sloping lines, drawing arcs and circles).		
		c. do basic lettering procedures.		
		d. use the most common scales.		
2. Shop Drawing*		a. use basic shop drawing tools.		
	6			

Notes: *Very elementary when used with the mini-module for the General Technology course.

Generalization G: Basic construction procedures and some of the unique characteristics of materials required to use each to its best advantage must be understood by the carpenter.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Wood		The student will:		
(i.) Structure and Classification		a. classify wood on the basis of physical properties such as: (i.) density (ii.) hardness (iii.) durability (iv.) strength (v.) color	Study charts and diagrams on the cross-section of a tree and of cell structure. Charts, cross-sections of actual trees.	
(ii.) Lumber		b. recognize common lumber defects and diseases. Defects related to: (i.) growth (ii.) seasoning (iii.) diseases (iv.) milling	Students should be given samples of commonly used hardwoods and softwoods to identify.	
(iii.) Manufactured Wood Products		c. identify commonly used types of lumber e.g. 2 x 4.	Students will identify frequently used wood products from samples of each.	

Notes: Commonly used products only should be introduced in this Topic; other materials will be studies as encountered in later Modules.

Topic VII: MATERIALS (Continued)

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		d. identify commonly used manufactured wood products. (i.) plywood (ii.) hardboard (iii.) Tentest (iv.) chipboard (v.) others		
	4			
		The student will:		
2. Glue		a. list four types of glue commonly used today.		
(i) Types and Properties		b. list advantages and disadvantages of each type		
		c. list specific uses for each type of glue		
(ii) Procedures		d. perform basic gluing procedures to produce maximum strength		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
3. Wood Finishes		The student will: a. identify the basic types of paints, varnishes, stains, etc. b. describe the types of thinners available for each type of finishing material.	Try a class project with each student using a different type of stain, varnish, oil, paint, etc. on a 3" x 5" wood sample to show different results.	
	4			

Notes:

Topic VIII: CAREER FIELD STUDY

Generalization H: There are many occupations within and related to the career field of Construction and Fabrication.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
1. Career Field Occupations		a. read about the various occupations available in the career field and entry requirements (Certification). b. list courses offered in his school system in the career field.	Lecture Class discussion Guest speaker Field Trips Slides Movies E. T. U. etc.	
(i) Related Occupations		c. Same as above		
(ii) Employment Opportunities Local Regional National	5	d. discuss employment opportunities in his career choice.	As above.	

Notes:

VI. BUILDING CONSTRUCTION

2. BUILDING CONSTRUCTION 22A

Cabinet and Furniture Making

INTRODUCTION

This course is open to any student having completed one of Building Construction 12, General Technology 10, or Materials 10. Students have the opportunity to use tools and materials which challenge them to high standards of workmanship in the production of cabinets and furniture.

REFERENCES

Dal Fabbro. *How to Build Modern Furniture.* F. W. Dodge Corp.,1957.

Douglass et al. *Units in Woodworking.* Delmar Publishers (Canada) Ltd., 1967.

Geck. *Interior Design and Decoration.* Wm. C. Brown Co. Publishers, 1971.

Harris. *Cabinet-Making and Building Construction.* McGraw-Hill Book Company.

Hepler and Wallach. *Architecture - Drafting and Design.* McGraw-Hill Book Company, 1971.

Practical Finishing Methods. Rockwell Manufacturing Co., 1954.

Soderberg. *Finishing Materials and Methods.* General Publishing Co., 1959.

Career Field: Construction and Fabrication

Topic I: INTRODUCTION TO CABINET AND FURNITURE MAKING

Major: Building Construction

Generalization A: Intelligent and effective work with wood presupposes a knowledge of design materials, processes and tools.

Course: Building Construction 22A (Cabinet and Furniture Making)

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
1. Design	32 hours	a. define the elements of design: line, form, color, light and material. b. explain the principles of design: balance, harmony, proportions and scale.	Research assignment.	
2. Material		a. describe the properties and structure of woods and be able to determine its suitability for particular application. b. illustrate the surface characteristics of lumber. c. describe the basic processes of lumber production: (i.) sawing (ii.) seasoning (iii.) grading (iv.) planning (v.) plywood manufacture	Study of various species of wood.	
3. Processes		a. perform the basic woodworking processes: (i.) sawing (ii.) surfacing (iii.) shaping	Demonstration of Processes	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		(iv.) joinery (v.) fastening		
4. Tools		The student will: a. classify tools functionally to indicate their purpose and use: (i.) measurement, layout and testing (ii.) saws (iii.) shaving and paring (iv.) boring, drilling and mortising (v.) abrasive (vi.) holding and supporting (vii.) impelling and percussion b. use handtools properly, safely and efficiently. c. care for and maintain tools in good condition. d. observe the general safety rules for operating power tools. e. observe stationary and portable power tools safely: (i.) saws (ii.) planers and jointers (iii.) portable routers (iv.) mortisers and borers (v.) sanders		

Notes:

Generalization B: Cabinet and furniture making is based on acceptable standards of jointing and assembly.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Jointing	14 hours	The student will: a. distinguish between "lay-up" and assembly joints. b. identify the factors to be considered when selecting a joint for a particular purpose: (i.) material type and size (ii.) strength (iii.) method of fastening (iv.) equipment available (v.) workmanship c. make the basic joints: (i.) edge to edge (ii.) lap (iii.) dado (iv.) rabbet (v.) mitre (vi.) mortise and tenon (vii.) dovetail (viii.) coped d. identify the basic rail joints used. e. identify the basic frame joints used. f. describe the basic joints for jointing rails to legs. g. describe the common methods of attaching doors and making them operable.	Make basic joints.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
		h. describe the common methods of providing for shelves. i. describe the common methods of making drawers and providing for their smooth operation. j. bond and fasten other material to wood.		
2. Assembly		a. describe the factors that determine the most suitable type of fastener for a particular job. b. identify the types and uses of adhesives. c. identify the types and uses of nails commonly used. d. identify the types and uses of wood screws and bolts commonly used. e. identify types and uses of cabinet hardware. f. clamp stock for assembling and gluing.		

Notes:

Generalization C: Finishing protects, preserves and beautifies the materials.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Protecting and Preserving	16 hours	The student will: a. define the purposes of finishing as applied to cabinet and furniture making. b. name the types of finishes used: (i.) paints and enamels (ii.) varnishes and lacquers (iii.) stains (iv.) fillers and sealers (v.) oils c. select finishes for specific types of woods and finish desired.		
2. Beautify		a. identify the finishing abrasives used: (i.) sandpaper (ii.) steel wool (iii.) pumice stone (iv.) rottenstone (v.) rubbing compound b. describe the methods and procedure in the application of: (i.) paints and enamels (ii.) varnishes and lacquers (iii.) stains (iv.) fillers and sealers (v.) oils c. observe the safe and recommended practices in the application of finish materials.		

Notes:

Generalization D: Furniture and cabinets must be functional and aesthetically pleasing.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Function - In rooms where cabinets and built-ins are located, the utility and livability depends on the balance and location of the cabinets.	70 hours	The student will: a. apply standards in relation to height, width and depth for: (i.) kitchen cabinets (ii.) bathroom vanities (iii.) wardrobes and storage closets b. design an efficient, attractive and easy to maintain kitchen based on: (i.) centers of activity (ii.) basic shapes (iii.) decor		
2. Appearance - Furniture forms and proportions are based on the needs of the human body for utilitarian and aesthetic purposes.		a. design and build such projects as: (i.) single pedestal desk (ii.) night table with drawer, etc.		

Notes:

VI. BUILDING CONSTRUCTION

3. BUILDING CONSTRUCTION 22B

Concrete and Form Making

INTRODUCTION

Students may register in Building Construction 22B following completion of one of Building Construction 12, General Technology 10, or Materials 10.

In this course they will learn to construct forms for concrete and to mix and place concrete. Also they will study the properties, strengths, and testing of concrete products.

REFERENCES

Concrete Form Construction. Delmar Publishers (Canada) Ltd., 1946.

A 23-1 - 1967 Concrete Materials and Methods of Concrete Construction. Canadian Standards Association.

Design and Control of Concrete Mixtures. Canada Cement LaFarge Ltd.

Supplement No. 5, Residential Standards - National Building Code. National Research Council, 1968.

Career Field: Construction and Fabrication

Major: Building Construction

Course: Building Construction 22B (Concrete and Form Making)

Topic I: PRINCIPLES OF LAYING OUT BUILDING LINES

Generalization A: Building lines are essential to provide proper reference points in positioning a structure on its site.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Information	20 hours	The student will: a. select the sources of information needed to establish building lines: (i.) plan of town, city or subdivision (ii.) zoning laws (iii.) plot plans (iv.) survey points (v.) datum points b. demonstrate through the study of a town or city planning system, zoning laws, and plot plans how information required for building lines can be used for a specific structure.	Study of town planning system, zoning laws and plot plans.	
2. Reference Points		a. (i.) locate lot stakes (ii.) determine set back and side location (iii.) lay out foundation lines for squareness: (a) 3:4:5 method (b) Transit and Builder's Level (iv.) establish elevations	Simulate an exercise in lot layout for a house.	

Notes:

Topic I: PRINCIPLES OF LAYING OUT BUILDING LINES (Continued)

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		b. (i.) erect batterboards (ii.) determine location of building lines on batterboards	Erect batterboards and transfer building lines to batterboards.	

Notes:

Topic II: INTRODUCTION TO CONCRETE FORM CONSTRUCTION

Generalization B: Foundations are essential for all types of structures and must be designed for varying soil conditions.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Foundations and Footings	20 hours	The student will:		
		a. group footings into the following types: (i.) wall footings (ii.) column footings (iii.) chimney footings (iv.) porch and stair footings (v.) stepped footings	A visit to a construction site.	
		b. identify the foundation types: (i.) T foundation (ii.) wall foundation (iii.) slab foundation (iv.) pier and column foundation		
		c. describe the difference between: (i.) spread type footings (ii.) pier footings (iii.) pile footings	Study of assorted house plans.	
		d. given a set of blueprints, be able to recognize the types of footings used in house construction.		
2. Design		a. identify footing design problems: (i.) simple stresses of materials (ii.) live and dead loads (iii.) transmission of loads to structural supporting members.		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		(iv.) depth of footings b. apply Residential Standards - requirements for footings for house construction.	A study of Canadian Residential Standards.	
3. Soils		a. identify the different types of soil conditions encountered in construction and their suitability as bearing surfaces. (i.) sand (ii.) clay (iii.) gravel (iv.) rock (v.) land fill	Tests demonstrating how sand, clay and gravel react when subjected to load conditions.	

Notes:

Generalization C: Forms are required to contain and to support the materials of concrete structures.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Forms	50 hours	The student will: a. describe form requirements: (i.) size and shape (ii.) strength (iii.) watertight (iv.) economy b. identify the materials used in form construction: (i.) wood (ii.) plywood (iii.) metals (iv.) earth (v.) patented form ties (vi.) sectional forms c. apply the CSA Standards for: (i.) form design (ii.) form construction (iii.) stripping and re-use of forms d. describe the function of each member of concrete forms by stating their requirements and relations (i.) shoe, plate (ii.) stud (iii.) waler (iv.) ties (v.) spreader (vi.) brace (vii.) stake	Build a section of footing forms.	

Notes:

Topic III: FORM CONSTRUCTION (Continued)

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
		e. construct and set forms for: (i) square type wall footing forms (ii) column footings (iii) stepped footings		
		f. define methods used to lock footings and foundation walls: (i) key ways (ii) steel dowelling	Build a section of forms.	
		g. build up double wall foundation forms.	Fabricate sectional wall forms and set up.	
		h. construct and set-up sectional plywood forms.	Secure walers to double wall and sectional wall forms.	
		i. build, set-up and secure walers.	Plumb and align double wall and sectional wall forms.	
		j. plumb and align concrete wall forms.		
		k. describe methods used in providing for intersecting walls and partitions.		
		l. describe methods to provide for openings in concrete walls and set bulkheads.	Build a rough buck for a casement window and install in double wall forms.	
		m. examine methods used in securing superstructure to sub-structure: (i) anchor bolts (ii) cast-in-place joists		
		n. illustrate methods used and be able to select suitable forming for:		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		(i.) steps on sloping ground (ii.) open steps (iii.) stairways The student will: o. explain the principles and methods for building: (i.) concrete walks (ii.) concrete driveways and patio (iii.) floors p. apply Residential Standards requirements for water proofing and dampproofing of floors and walls below grade.	Provide for project in walk, etc.	

Notes:

Generalization D: Concrete as a durable material is used extensively for varied building purposes.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Concrete - a building material	40 hours	The student will: a. define concrete. b. summarize the fundamental facts about concrete: (i.) range of proportions of materials used in concrete (ii.) essential requirements of concrete (iii.) relationship in concrete		
		c. outline the utility and possibilities of concrete construction.	Research assignment to acquaint himself with current trends.	
- quality concrete is made by selecting suitable materials.		a. summarize the manufacture of Portland Cement: (i.) raw materials (ii.) steps in manufacture (iii.) types of Portland Cement b. test suitability of mixing water for concrete. c. describe the types of aggregates in concrete: (i.) stone aggregates (ii.) lightweight aggregates d. determine suitability of the types of aggregates for specific situations: (i.) characteristics of aggregates (ii.) grading	Study samples. Perform tests.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		(iii.) testing (a) clorimetric (b) silt (c) fineness modules		
- quality concrete dependent upon thoroughly mixing the materials in the right proportions and them correctly placing, finishing, and curing the resulting mix.		a. recognize the need for systematic control in selecting mix characteristics of concrete: (i.) job requirements (ii.) water cement ratio (iii.) aggregate size (iv.) suggested proportions of materials	Solve problems in use of volume and weight charts for designing concrete mixes.	
		b. understand the facts and principles about the methods and conditions for: (i.) mixing concrete (a) stationary mixing (b) ready mixed (ii.) placing concrete (iii.) finishing concrete surfaces (iv.) curing concrete	Study CSA Standards. Mix sample batches of concrete for testing purposes. Pour sidewalk blocks.	
- concrete structural members are prefabricated for a variety of purposes.		a. explain specific uses of the types of prefabricated concrete products: (i.) precast concrete (ii.) concrete blocks (iii.) cast stone		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
- concrete is high in compressive strength and is reinforced with high tensile, materials for varying conditions.		The student will: a. describe the principles and theories of reinforced concrete b. outline the materials used to reinforce concrete.		

Notes:

VI. BUILDING CONSTRUCTION

4. BUILDING CONSTRUCTION 22C

Framing (Residential)

INTRODUCTION

This course is open to any student who has completed any one of Building Construction 12, General Technology 10, or Materials 10.

Students should learn labor and material saving methods of construction in accordance with good building practice.

This Module is organized under the following Topics.

1. Floor Support Framing
2. Floor Framing
3. Wall Framing
4. Ceiling and Roof Framing

Material costs may be reduced and students more highly motivated if an actual building, such as a lake cottage, can be prefabricated at school and set up on site.

REFERENCES

Miller, H. G. *Building Construction: Materials and Methods.* Macmillan of Canada, Toronto.

Canadian Wood-Frame House Construction. C. M. H. C., Ottawa.

Supplement No. 5, The Residential Standards - National Building Code. C. M. H. C., National Research Council, 1968.

Jones, R. P. *Framing, Sheathing and Insulation.* Delmar Publishers (Canada) Ltd., 140 Birchmount Road, Scarborough, Ontario.

Wass, A. *Building Construction: Roof Framing.* Prentice-Hall, 1960.

Smith. *Principles and Practices of Light Construction.* Prentice-Hall, 1963.

Career Field: Construction and Fabrication

Major: Building Construction

Course: Building Construction 22C (Framing - Residential)

Topic I: FLOOR SUPPORT FRAMING

Generalization A: Accurate layout and erection of bearing walls or beam and posts is basic to quality building.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Layout		The student will: a. design and layout both bearing wall and beam and post systems.		
2. Construction and Erection		a. construct and erect two systems: (i.) beam (ii.) post b. use the Residential Standards to deduce the correct type, size and spacing of material.		

Notes: Throughout this module the student will be instilled with a sense of pride in his work.

Generalization B: Accurate layout and construction of the floor frame is essential in quality building.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Layout		The student will: a. given accepted joist spacings, select the proper type and size of material to suit each spacing according to Residential Standards.		
2. Construction		a. using full-sized materials, set up a section of a floor frame including floor openings, bridging joist hangers, blocking, etc. according to accepted practice.		
3. Sheathing		a. compare the strength, nail-holding power, application time, and cost of various subfloors.		
4. Bracing		a. cut and install cross bridging, strap bridging, and solid bridging. b. find examples of metal bridging.		

Notes:

Generalization C: There are three basic types of framing used in Canada (Post & Beam, Balloon and Western Platform). Western Platform is almost exclusively used in Alberta today.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Post and Beam		The student will: a. explain the basic design of post and beam framing. b. state some of the advantages and disadvantages and how it differs from Western Platform.	Field trips could be arranged; blueprints could be studies and discussed.	
2. Balloon		AS ABOVE		
3. Western Platform		a. discuss the advantages and disadvantages of Platform framing. b. lay out plates, calculate lengths of studs, cripples, trimmers, thicknesses and depths of lintels and beams, and lay ou out for openings in floor and walks. c. read and interpret various tables in the Residential Standards.	If possible, a garage or simple lake cottage can be framed. It will be built as theory, drafting, and shop drawing progress. Elevation and cross section draftings of framing should be made.	
4. Special Light Frame Construction		a. examine pictures or models of more recent types of light frame construction such as A frame and Rigid frame. b. list advantages and disadvantages of each type.	Scale model of these types could be constructed by students to use as examples. A small cottage of either of these types could be built in the shop. A cross section drafting of each type should be done by each student.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
5. Sheathing		The student will: a. examine several types of wall sheathing used and the proper application of each type.	Apply wall sheathing where applicable.	

Notes:

Topic IV: CEILING AND ROOF FRAMING

Generalization D: Skillful construction of the ceiling and roof unit adds strength to, and reduces movement and moise of, a frame building.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Ceiling Framing		The student will: a. select thickness and width for ceiling joists and beams to suit various spans. b. attach joists over a beam and to the side of a flush beam (joist hangers, ledgers, etc.). c. frame rough openings and install backing and blocking for partitions and ceiling finish.	If possible, a small cottage could be built, if not, a mock-up using full sized material should be constructed as theory progresses.	
2. Roof Framing (a) Types		a. describe various roof types built and will identify the type most commonly used in Alberta.	Students could work in pairs to build models of the various types of roofs.	
(b) Terminology		b. memorize terminology used in roof-construction.	Students should build pitch boards of several pitches to help understand the relationships.	
(c) Regulations		c. explain the relationship between the terms rise, run, and line length.		
(d) Construction		d. determine the proper widths of rafters for the various spacings and spans using the Residential Standards code. e. erect and nail a roof frame in place, according to good building practice and regulations. f. close in a roof cornice.	Students will build a cornice section c/w lookouts, lookout ledgers, rough fascia, soffit and finish fascia. If practical they will build the cornices on	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:	an actual building.	
(e) Sheathing		g. examine and describe the various types of sheathing used for covering a roof frame. h. apply and fasten roof sheathing to comply with the Residential Standards and good building practice. i. use various types of fasteners used in Alberta.	Students will apply sheathing to roof sections they build or to an actual building where practical.	
3. Special Ceiling / Roof Framing		a. describe a variety of roof trusses used for different spans and the limitations of each type of truss. b. explain several methods of building trusses and the reasons for building a certain type of truss.	Students should design and build model trusses of a King Post truss, a W or Fink truss, a Long Span Truss, a Scissors truss, a Bowstring truss, and a Flat Roof (or Floor) truss. If practical students should make a set of trusses for an actual building with a gable roof.	

Notes:

VI. BUILDING CONSTRUCTION

5. BUILDING CONSTRUCTION 32A

Sketching, Blueprint Reading, and Estimating

INTRODUCTION

This module will aim at providing a detailed listing of activities and performance objectives in the Sketching, Blueprint Reading & Estimating course. Time allotment - approximately 130 hours. This course may be taken at any time following the introductory module.

The sketching part of the proposal will require drafting and/or layout facilities. The most efficient methods for communicating to the builder the desires of the architect will be sampled by the student, e.g., orthographic working drawings, sections, isometric pictorial drawings, exploded views, etc.

The estimating part of the proposal will require two sets of blueprints, each for a different light frame, one-storey residential building. An adequate supply of simplified estimating forms will be required.

It is proposed that a step-by-step estimate of the cost of one bungalow be done by the teacher with the help of the students in the classroom. An estimate of the cost of the second bungalow will be done by the students as a home assignment and they will be evaluated on this work.

The student uses architectural symbols and will produce the various typical views of the object in the sketching section of the course. He will

INTRODUCTION (cont'd)

be required to read blueprints in order to perform the estimating requirements. Blueprint Reading will thus evolve from both the Sketching and the Estimating parts of the course.

An important requirement will be a comprehensive study of the theory of construction and of the materials of construction. These topics may run concurrently with the Sketching, Blueprint Reading & Estimating course.

REFERENCES

Walker, Frank R. *The Building Estimators Reference Handbook.* Frank R. Walker Co., Chicago, Illinois, 1970, 17th edition.

Hornung, Wm. J. *Blueprint Reading.* Prentice-Hall, Englewood Cliffs, N. J., 1961.

Quinlan, Charles. *Orthographic Projection Simplified.* McKnight & McKnight Publishing Co., Bloomington, Illinois, 1969.

Sundberg, Elmer W. *Building Trades Blueprint Reading.* American Technical Society, Chicago, Illinois, 1967, 4th edition.

Wass, Alonzo. *Building Construction Estimating.* Prentice-Hall Inc., Englewood Cliffs, N. J., 1963.

Peurifoy, R. L. *Estimating Construction Costs.* McGraw-Hill Book Co. Ltd., New York, 1958, 2nd edition.

Career Field: Construction and Fabrication

Topic I: QUANTITY SURVEY

Major: Building Construction

Generalization A: Building costs are dependent upon material and labor quantities required.

Course: Building Construction 32A (Sketching, Blueprint Reading and Estimating)

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Excavation - Top Soil - Mass Excavation - Hand Excavation - Shoring & Fencing - Backfill - Machine - Backfill - Hand - Trenching - Haulage	3 hours	The student will: a. prepare and present a quantity survey of the materials required for construction listed under each concept. b. prepare and present an estimate of the labor required for each operation using methods found in an approved estimating handbook. The neatness and accuracy of the presentation will be of a standard acceptable to the teacher and explained to the student at the beginning of the course.	Lectures on construction methods.	Textbook illustrations. Sample estimate sheets. Slides.
2. Formwork - Footings - Walls - Steps - Sidewalks - Pier Pads	3 hours			

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
3. Drainage - Weeping Tile - Crushed Rock - Vapor Barrier	3 hours			
4. Concrete - Wall Footings - Walls - Steps - Sidewalks - Pier Footings - Driveways - Floors - Pilasters - Reinforcing	6 hours			
5. Waterproofing and Dampproofing - Emulsion - Plastic Membrane - Parging	3 hours			

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
6. Floor Support - Wood Frame - Bearing Partition - Wood Posts - Teleposts - Solid Wood Beam - Laminated Wood - Beam - Steel Beam - Reinforced Concrete Beam - Floor Hangers	3 hours			
7. Floor Assembly - Joists - Headers - Bridging - Subfloor	3 hours			
8. Walls - Plates - Studs - Girths - Windproofing Paper - Sheathing	3 hours			

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
9. Ceiling Joists & Roof Framing - Joists - Bridging - Common Rafters - Hip Rafters - Jack Rafters - Ridge Board - Gable Studs - Rafter Bracing - Collar Ties - Purlins - Barge Board - Sheathing	6 hours			
10. Roof Covering - Wood Shingles - Asphalt Shingles - Asbestos Shingles - Flashing	3 hours			

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
11. Doors and Windows - Window Frames - Basement Windows - Main Floor Windows - Storm Sash - Screens - Door Frames - Exterior Doors - Interior Doors - Combination Doors	3 hours			
12. Interior Finish - Insulation - Vapor Barrier - Hardwood Floor - Tile Floor - Carpet - Baseboard - Carpet Strip - Window and Door Casing and Trim - Cabinets	6 hours			

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
13. Exterior Wall Finish - Siding - Stucco Wire - Stucco - Brick Veneer - Exterior Casing - Drip Cap - Louvres	3 hours			

Notes:

Generalization B: Application of Unit Costs to Quantities Required is a simple mathematical process requiring limited knowledge of construction.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Unit Costs	6 hours	The student will: a. apply unit costs to the material and labor quantities already derived with neatness and accuracy to a standard set by the teacher.		Lists of current unit prices for material. Up-do-date wage rates for tradesmen.

Notes:

Topic III: SUB-TRADE BIDS

Generalization C: Many operations must be completed by specialists in specific trades who are best able to estimate costs.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Sub-Trades - Plumbing - Painting - Electrical - Heating - Plastering or Dry Wall - Sheet Metal Work - Landscaping	3 hours	The student will: a. recognize a valid sub-trade bid and include it in his estimates with acceptable neatness and accuracy.	Various methods of applying unit costs to sub-trades will be examined.	

Notes:

Topic IV: OVERHEAD AND PROFIT

Generalization D: A competitive bid will include job overhead, general overhead costs and a realistic profit.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Job Overhead - Salaries - Temporary Buildings - Legal Costs - Permits - Utilities - Testing - Progress Reports - Professional Services - Final Cleanup - Plant	2 hours	The student will: a. include realistic job overhead items with his estimate.	The teacher will provide costs from his research and will discuss them with students.	
2. General Overhead	1 hour	a. list general overhead items and calculate the percentage to be added.		
3. Profit	1 hour	a. increase his estimate by the addition of a realistic profit percentage.		
4. Submission of Bid	1 hour	a. complete his estimage and submit a stipulated sum bid which differs from a bid provided by the teacher by no more than 5%.		

Notes:

Topic V: BLUEPRINT READING

Generalization E: The communication service provided by working drawings requires the brevity of extensive use of symbols.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Architectural Symbols - Construction Symbols - Electrical Symbols - Heating Symbols - Plumbing Symbols	6 hours	The student will: a. prepare a drawing sheet containing typical construction details with the proper symbols indicated b. identify 90% of the materials and installations pointed out by numbers on a typical blueprint.		Students will be provided with information sheets illustrating typical symbols. Drafting instruments, paper, board, etc. will be used. A number of blueprints of residential construction will be on hand for stude perusal.

Notes:

Generalization F: The desires of the client can most efficiently be transmitted to the builder by means of drawings.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Working Drawings	9 hours	The student will:		
- Orthographic Drawings		a. prepare a five-view orthographic drawing of a simple bungalow of rectangular plan. The standard orthographic arrangement of top (birdseye), front left side, rear, right side views will be used. Information provided will be a plan view and pertinent specifications.		Drawing equipment in a drafting room will be used.
- Sectional Drawings		b. prepare a three-view sectional drawing of a typical construction project, e.g., kitchen cupboard unit. The three views will be one horizontal section and two vertical sections. Information provided will be a front view and pertinent specifications.		
- Exploded View		c. prepare an exploded view of the framing of a single garage of frame construction showing all plates, studs, lintels, etc., in proper position. The drawing will consist of a plan view and the four elevations in exploded arrangement. Information provided will be an information sheet with pertinent dimensions and specifications.		Drawing equipment in a drafting room will be used.

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
- Full Scale Layout	9 hours	The student will: d. design by mathematics calculation or by step-off a notched-string stair for a given situation. He will then lay out on a sheet of Kraft building paper the full size layout of one stringer for this stair.		

Notes:

Topic VII: SKETCHING

Generalization G: Limited time and limited facilities often require a drawing to be produced by free hand sketching.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Freehand Sketching	9 hours	The student will: a. produce a freehand sketch of the basement plan of a simple bungalow showing all symbols and hidden lines. Information given will be a main floor plan view and pertinent dimensions and specifications. Accuracy and neatness will be of a standard acceptable to the teacher.		

Notes:

Topic VIII: PICTORIAL DRAWING

Generalization H: In order to provide an overview of a construction project, a pictorial representation is often necessary.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Pictorial Drawing - Isometric Drawing	9 hours	The student will: a. given pertinent dimensions and specifications, produce an isometric drawing of a typical construction project, e.g., kitchen cabinet.		

Notes:

VI. BUILDING CONSTRUCTION

6. BUILDING CONSTRUCTION 32B

Exterior and Interior Finishing

INTRODUCTION

This course is open to any student who has completed one of Building Construction 12, General Technology 10, or Materials 10. It is recommended that they also have a minimum of one of the second level courses (22).

The finishing course deals with the design, materials and tool processes required to finish a building. Elements of construction relating to roofs, stairs, windows, doors, insulation, finish flooring, dry wall and paints will be studied.

REFERENCES

Hepler & Wallach. *Architecture - Drafting and Design.* McGraw-Hill Book Co., 1971.

Centigrade Handbook of Red Cedar Shingles. Red Cedar Shingle & Handsplit Shake Bureau, 1964.

A Glossary of House - Building Terms. Central Mortgage and Housing Corporations, 1970.

McDonnell. *Hand Woodworking Tools.* Delmar Publishers (Canada) Ltd., 1962.

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Geck. *Interior Design and Decoration.* Wm. C. Brown Co. Publishers, 1971.

Smith. *Principles and Practices of Light Construction.* Prentice-Hall Inc., 1963.

Supplement No. 5, Residential Standards - National Building Code. National Research Council, 1968.

Wilson & Weiner. *Simplified Stair Layout.* Delmar Publishers (Canada) Ltd., 1947.

Unit Course in Interior and Exterior Trim. Delmar Publishers (Canada) Ltd.

Career Field: Construction and Fabrication

Topic I: INTRODUCTION TO EXTERIOR AND INTERIOR FINISHING

Major: Building Construction

Generalization A: The exterior and interior coverings and finishings will be influenced by the design and materials used.

Course: Building Construction 32B (Exterior and Interior Finishing)

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Design	10 hours	The student will: a. identify the basic elements of design: form, space, light and shadow, line, texture and color, as used in house design. b. explain how the basic elements of design are used to achieve unity, repetition, rhythm, variety, emphasis and balance.		
2. Materials		a. describe the general types of materials used for finishing purposes: (i.) Woods (ii.) Glass (iii.) Composition materials (iv.) Tile (v.) Masonry b. obtain information from various authorities to determine proper selection and application of materials: (i.) NHA Housing Standards (ii.) Canadian Standards Assoc. c. explain how contemporary design has affected the development of modern materials.	A study of buildings in an area.	

Notes:

Topic II: SAFETY

Generalization B: A prime requirement of all craftsmen is to be thoroughly familiar with safety requirements of their own specific work.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Scaffolds and Ladders	24 hours	The student will:		
		a. be familiar with the types of scaffolds and ladders commonly used in construction.	Field trip. Lecture.	
The best designed scaffolds and ladders are safe only if they are built and used correctly.		The student will: a. use scaffolds and ladders safely. b. identify the requirements for constructing and erecting scaffolds and ladders.	Ladder or step-ladder.	
2. Power and Hand Tools		a. safely and correctly handle and use all types of tools: (i.) stationary machines (ii.) portable power tools - electric - power-activated - pneumatic (iii.) hand tools		

Notes:

Generalization C: Exterior finishings and coverings are both functional and decorative.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Cornices and Eave Projection	30 hours	The student will: a. describe the materials used and common practices for cornice and eave construction. b. identify the types and purposes of cornices.	Simulate project to build a boxed cornice.	
2. Exterior trim		a. apply exterior trim. b. identify the materials used for exterior trim.	Apply stucco mould around window and door in a simulated project.	
3. Roof Finishing		a. describe the materials used for roof coverings. b. summarize the methods and principles in the application of roofing materials. c. refer to the Residential Standards requirements for roofing.		
4. Windows and Doors		a. explain the principles of window and door design. b. identify the basic types of: (i.) windows (ii.) doors c. design window and door frames. d. describe methods and procedures for installing window and door frames.	Simulated project to install window and door.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
5. Exterior wall coverings		The student will: a. describe the materials commonly used for wall coverings. b. develop the necessary skills for the application of exterior finishing materials.	Simulated projects to apply bevel siding.	

Notes:

Topic IV: STAIR CONSTRUCTION

Generalization D: Stairs are provided for access to and descent from one level of a building to another.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Stair design	24 hours	The student will: a. explain the factors of stair design and principles of stairway construction. b. identify the various types of stairways commonly used. c. describe the various parts of a stairway.		
2. Stair layout		a. select information from a set of plans to make a stair layout. b. apply the information obtained from a set of plans to make the mathematical calculations. c. describe the principles of layout procedures for the various parts of the stairway. d. build and erect a flight of stairs.	Build a half scale flight of stairs for a house.	

Notes:

Topic V: INSULATION, VAPOR BARRIERS, BUILDING PAPERS AND VENTILATION.

Generalization E: Effective use of insulation, vapor barriers, building papers and proper ventilation adds to living comfort.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		The student will:		
1. Insulation	6 hours	a. explain the principles of heat and sound transmission. b. describe the types and functions of insulating materials. c. install insulating materials.		
2. Vapor barriers		a. explain the principles and materials of vapor barriers.		
3. Building papers		a. define the types and functions of building paper.		
4. Ventilation		a. explain the principles of effective ventilation: (i.) roof ventilation (ii.) crawl space		

Notes:

Generalization F: A wide variety of building materials have been developed for interior finishing purposes that are both functional and decorative.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Wall and Ceiling Materials	22 hours	The student will: a. identify the types of wall and ceiling finish materials commonly used: (i.) wood (ii.) lath and plaster (iii.) dry wall construction (iv.) clay products (v.) hardboard and accoustical materials		
		b. outline the principles and practices of installing interior finish materials.	Apply gyproc and tape joints to a simulated project.	
		c. identify the types of interior wood trim materials used.		
		d. develop the skill and workmanship in joinery to apply interior trim.	Make assorted joints with a variety of trim materials.	
2. Finished Floors		a. identify the general classification of types of materials of finished flooring: (i.) wood (ii.) tile (iii.) cement and terrazzo (iv.) resilient floorings (v.) carpets		
		b. explain the principles and practices of finish floor installations.		

Notes:

Topic VII: PROTECTIVE AND DECORATING COATINGS

Generalization G: Fluid materials used as thin coatings for building materials provide protection, decoration and ease of maintenance.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Materials	16 hours	The student will: a. identify the various protective and decorative coatings used in industry: (i.) paints and enamels (ii.) varnishes and lacquers (iii.) stains (iv.) fillers and sealers (v.) oils		
2. Application of Materials (a) Paints and enamels provide an opaque finish where a solid color is desired. (b) Varnishes and lacquers are used to provide a clear durable surface. (c) Stains are used to bring out the grain in wood, to enrich the color and to change color in		a. describe the recommended practices in using the various protective and decorative coatings.		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
wood. (d) All woods are porous and must be filled and/or sealed for succeeding coatings of paintings and varnishes.				

Notes:

VI. BUILDING CONSTRUCTION

7. BUILDING CONSTRUCTION 32C

INTRODUCTION

This last module in the Building Construction major is open to students who have completed 30 credits or six modules in the major.

The 125 hours of instruction time available in this module may be used to:

a. provide greater depth to a module taken previously. Individual students, groups of students or the whole class may elect to study an area in depth. This could be cabinet making, framing (commercial or residential), concrete work or any of the modules named in the Building Construction sequence.

b. engage in actual construction work supervised by the Building Construction teacher as a work experience coordinator and a journeyman on the job.

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